

PhotoTrove User Manual

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1 PhotoTrove Overview

1.1 About this document

Copyright © 2015 Theodore B. Ruegsegger. The source components of this document are written in `asciidoc` markup and used to generate a finished manual in HTML, PDF or other formats as needed.

1.2 The Problem

Now that we all have digital cameras that never run out of film, more and more of us are finding it difficult to keep track of all our photos and videos. It's easy to accumulate tens of thousands of photos in a short time, and sticking them into labeled folders on our computers works about as well as when we kept our prints and negatives in shoeboxes. Why not use all this computer power to do the housekeeping for us?

1.3 What Is PhotoTrove?

PhotoTrove uses an industrial-quality database management system to keep track of every photo and video in a large collection, with detailed descriptions, timestamps and locations so you can find them easily, edit them, group them, compare them, arrange them and conveniently publish them. It includes a comprehensive search tool as well as easy handoff to your favorite photo-editing tools.

PhotoTrove runs as a web application on your local network, so multiple users can work independently and simultaneously. Anyone whose browser can see the PhotoTrove server¹ can view photo sets and albums, carry out searches and download individual photos, but only authorized users can change anything. Since all the data is in one place, it's easy to set up automatic backups so you can be confident your valued photos are safe.

1.4 What Isn't It?

While PhotoTrove does let you assemble photos and videos from anywhere in your collection into albums for publishing, the resulting albums are nothing fancy, just a series of linked pages containing your photos, videos and captions that can be burned to a CD or DVD, copied to a thumbdrive or uploaded to a static website. There are many applications as well as web services available that let you arrange a set of photos into a visually stunning album. If that's what you want, use PhotoTrove to find and collect the particular photos you want and then hand them off to an album-finishing tool or service.

1.5 Features

With PhotoTrove and your favorite web browser, you can:

- Keep track of *all* your photos and videos, with descriptions, timestamps and locations.
- Edit the images and videos using your favorite tools, with special support for stitching panoramas.
- Make up descriptive tags and attach them to any photos you wish, to enable complex searches and group actions.
- Locate photos in your collection, searching by pretty much anything: date range, location, text in descriptions and captions, tags, etc. and then carry out group operations on all matching photos.
- Assemble albums by selecting images from multiple photo sets and adding layout and captions.
- Publish albums as collections of static HTML documents that you can copy to a CD, DVD or thumbdrive or upload to a website. Yes, they'll still play videos in the browser, either way.

¹ Server: Don't be put off by the word *server*; PhotoTrove can easily run on the same machine as your browser, perhaps as a virtual machine running on your laptop.

1.6 Sample Albums

Here are some sample albums produced using PhotoTrove and its predecessor the Photo Album Manager. Note that they make little use of style sheets, but that can easily be added. I welcome suggestions for a nice default style, or perhaps a set of user-selectable styles. Naturally, I also welcome URLs for sample albums to add to this section.

1.7 System Requirements

PhotoTrove is a web application written mainly in PHP using the Apache web server and the PostgreSQL database management system. It also makes use of the GraphicsMagick graphic tool collection, the ffmpeg2theora video converter and the oggvideotools set, the MPlayer video player/analyzer and traditional Unix tools like Bourne shell, cat, grep, sort, tr and sed.

For more details, see the [Architecture and Design](#) Appendix [A](#) appendix.

Requirements depend on how you wish to run PhotoTrove:

1. To run the Trovester “appliance” you need only a computer with sufficient speed, memory and disk space running any of the more common operating systems. More specifics in the [Trovester](#) Appendix [C](#) chapter.
2. To run your own PhotoTrove directly on a machine (real or virtual):
 - That machine must run some version of Debian or Ubuntu GNU/Linux if you’re going to use **EasyPhotoTrove** to set it up, because that’s what EasyPhotoTrove knows how to use. If you want to set up the whole thing yourself, any recent version of GNU or Unix that supports the required packages should do.

Tip

Another advantage of EasyPhotoTrove, which also applies to Trovester since it’s built with EasyPhotoTrove, is that you can [upgrade automatically](#) to the latest version of PhotoTrove.

- You’ll need sufficient disk space for all the images in your collection; this can vary widely depending how many photos and videos you take and at what resolution. Say a few tens of gigabytes to get going. Be sure to allow for backups!

1.8 License

This collection of program code and documentation is free software; you can redistribute it and/or modify it under the terms of the GNU General Public License as published by the Free Software Foundation; either version 3 of the License, or (at your option) any later version.

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2 Photo Management Overview

Tip

The instructional sections of this manual use certain terms in very specific ways. To avoid confusion, refer to the [Glossary](#) [Glossary](#). For a pictorial representation, have a look at the [Data Model](#) Section [A.3](#).

AS YOU ACQUIRE NEW PHOTOS (INCLUDING VIDEOS):

1. Get them into PhotoTrove:
 - a. By hook or by crook, upload the photos from the camera to the **originalphotos** area.
 - b. In your web browser, open PhotoTrove and log in².
 - c. Import the photos as a photo set.
2. Edit the new photo set:
 - a. Look the photos over and cull obvious rejects.
 - b. Set locations, enter descriptions, rotate as needed.
 - c. Compare similar pictures, cull some more.
 - d. Edit individual photos offline, as needed.
 - e. Annotate the whole photo set.

FINDING PHOTOS:

- Browse photo sets
- Browse albums
- Search

ORGANIZING YOUR PHOTOS:

- Assemble a photo album:
 - a. Add photos to the album from thumbnail galleries of photo sets or search results.
 - b. Edit the photo album.
- Tag photos

SHARING PHOTOS:

- Share individual photos
- Publish an album:
 - a. Generate a publishable copy of the album.
 - b. “Burn” the copy to a CD or DVD or to a thumbdrive.
 - c. Upload the copy to a website.
 - d. Make your own Internet website.

SAFEGUARDING YOUR PHOTO COLLECTION:

- Set up backups:
 - a. Choose a backup strategy.
 - b. Set up automatic backups.
 - c. Test your backups.

² Browser login: Unless otherwise noted, assume the user account has the required privileges to edit photos and albums and/or to publish albums, as the case may be. Your browser must allow Javascript and accept cookies from the PhotoTrove server and, if prompted, accept the self-signed security certificate.

3 Getting Photos into PhotoTrove

More and more devices can take pictures these days, and they store those pictures in many different ways, so we need to be flexible and resourceful in transferring those pictures to the PhotoTrove server. All that matters is the result:

1. The photos should be uploaded to the server in their own folder under the **originalphotos** folder (`/home/public/photos/`).
2. Each individual photo folder must have a name³ that
 - is a legal file name, that is, without spaces or special characters;
 - is unique;
 - sorts usefully among the other folders.

In order to upload photos to the PhotoTrove server, you must have a user login account on the server. The `/home/public/photos/` folder is writeable by all users, so no special access is required.

3.1 Accessing the Images on the Camera

Depending on the camera and client computer (the one from which you're connecting to PhotoTrove, not the server⁴) platform, there are several ways to access the photos. Most cameras have a folder named `dcim` or `DCIM`, per the **Digital Camera IMages specification**, containing one or more subfolders with images.

- You can remove the flash memory from your camera (typically an SD or micro-SD card) and connect it to your client computer via a USB adapter or directly into a memory card socket, if your computer has one.
- You can connect your camera to your client computer via a USB cable; some cameras will connect immediately, some need to be turned on.
- Some cameras or smart phones may connect via Bluetooth or even directly to a wireless network.

Whatever you do, verify that your computer sees a `dcim` folder, preferably as the top of the mounted flash drive.

3.2 Transferring the Images to **originalphotos**

This also depends on server configuration, client platform and camera.

- **fotoxfer.sh on GNU or Unix client:** If the `dcim` folder is the top folder and your client computer is running some version of GNU or Unix, you can run the `fotoxfer.sh` script. If it's not already installed, you can find it in the PhotoTrove distribution as `scripts/fotoxfer.sh`; copy it to the execution path (typically in `/usr/local/bin/`). The script will mount the flash drive, copy the images to the server under a folder with a unique (timestamped) name, verify that the copy succeeded, ask if you wish to erase the flash drive and, finally, unmount the flash drive so it's safe to remove it. For details, type: `fotoxfer.sh -h`
- **fotoupload.sh on server:** If the `dcim` folder is the top folder and your server is conveniently accessible, you can connect the camera's memory to the server's card socket or USB port, log in to the server and then run the `fotoupload.sh` script, which does exactly the same as `fotoxfer.sh` but locally. For details, type: `fotoupload.sh -h`
- **MobaXterm on Windows client:** This **GPL** tool will take care of everything, including file transfers, logging in to the server, even displaying X11 applications. To transfer photos:

1. Launch MobaXterm and start an SFTP session to the PhotoTrove server with initial directory `/home/public/photos`.

³ Appropriate folder name: I recommend a timestamp, either the time when uploaded or that of the most recent photo, e.g., `20150108-180204`, so the folders sort nicely in the menu. Whatever format you choose, be consistent. Avoid spaces in folder and file names.

⁴ Client: As noted previously, the client and server could be the same machine.

2. In the remote window, make a new folder with an appropriate name³.
 3. Still in the remote window, open the new folder.
 4. Using your Windows file manager, navigate to the new photos and drag them into the remote window. MobaXterm will transfer the images over the network.
 5. Optionally, erase your camera's `dcim` folder.
 6. Release and remove the flash memory or camera.
- **Other tools on Windows client:** There are numerous ssh and file transfer tools for Windows, for example, **PuTTY**, **FileZilla**, **WinSCP**, and **Cyberduck**, to name a few. If you're accustomed to a particular tool, use that to:
 1. Create a new folder under `/home/public/photos/` on the PhotoTrove server with an appropriate name³.
 2. Transfer the images from the `dcim` folder to the new folder.
 3. Optionally, erase your camera's `dcim` folder.
 4. Release and remove the flash memory or camera.
 - **MacOS X client:** SSH and file transfer tools include **Fugu** and **Cyberduck**. If you're accustomed to a particular tool, use that to:
 1. Create a new folder under `/home/public/photos/` on the PhotoTrove server with an appropriate name³.
 2. Transfer the images from the `dcim` folder to the new folder.
 3. Optionally, erase your camera's `dcim` folder.
 4. Release and remove the flash memory or camera.

3.3 Importing the Photos as a Photo Set

1. In your web browser, open PhotoTrove and log in².

Tip

Take advantage of your browser's tab capability. Once you've logged in, open menu items in a separate tab. Not only does this leave the main menu available at any time, it allows you to recover from session time-outs by reloading the first tab, thereby repeating the login.

2. From the main menu, select **Import a photo set**.
 3. Select the desired folder from the menu.
 4. Review the settings. In particular, if your camera's clock is set to local time rather than UTC (Coordinated Universal Time, aka Greenwich Mean Time), select the local time zone. If your camera is using some different time zone, don't worry: you can adjust times and timezones later. Unless you never travel, I recommend setting your camera to use UTC/GMT without adjusting for daylight saving.
 5. Click **Create Photo Set**. It will cook for a while, depending how many photos or videos are in the set, how large they are, and how fast your server is.
 6. When it finishes, you can edit the new photo set or import another one.
-

4 Editing a Photo Set

Open the Photo Set Worksheet page, either by clicking **Edit this photo set** after importing it or by selecting **Edit photo sets** from the main menu and selecting the desired set.

4.1 Editing Many Photos

Below the action widgets you'll see a thumbnail gallery of all the photos and videos in the set. Things you can do here:

- **Select photos:** You can click the checkboxes (or the filenames) of individual thumbnails, or you can select one or more sequential ranges of thumbnails by selecting the first and last of each range, then clicking **Select Range**, or you can click **Select All**.

**Caution**

Before carrying out any actions, scroll down and verify that you really did select the pictures you intended.

- Clear all selections by clicking **Clear Selections**.

Tip

This is the safest way to reload the page.

- Carry out actions on all selected photos. Assigning locations and descriptions, turning and deleting photos are self-explanatory. Albums and tags are discussed in more detail later.
-

Select All Select Range Clear Selections	
Assign this location to selected photos:	Where taken: (unknown) v If "other", specify: Apply
Assign this description to selected photos:	Description: Apply
Add selected photos to this album:	Album: — Select album — v New Album name: Append
Tag selected photos:	Tag name: — Select tag — v New tag name: Apply
Turn selected photos:	90° Right 90° Left 180°
Delete selected photos:	This is final, and can't be undone. Be sure! Delete

For convenience when assigning locations and descriptions, you can hide from the gallery all the thumbnails that already have them assigned.

4.2 Editing Individual Photos

Clicking any individual thumbnail opens the webpic view in a separate tab. Things you can do here:

- Assign location and description, rotate, and delete, just as in the thumbnail gallery.
- Assign a timestamp. Normally the import process extracts the timestamp from the photo's EXIF data, but some photos won't have that. If you need to adjust the time for many photos because the camera's clock or time zone was off, use the **Adjust Timestamps** tool from the main menu. If you need to assign a date to a lot of photos, for example, scanned slides, use the **Apply Dates** tool.
- Download the full-size image, for example, to edit it.
- Replace the image with a new version.

Note that in the webpic view, clicking on the right or left margin of the image moves forward or backward through the photo set. For videos, small navigation arrows below the video server the same purpose.

Finally, back on the Photo Set Worksheet page, you can click the **Edit Notes** button to annotate the photo set as a whole. You can enter a nickname, which is any descriptive text that helps you identify the set. You can also enter any notes you wish. If you've entered locations and descriptions for all the photos, the **Summarize Descriptions** button will be a good start. Be sure to save changes.

4.3 Checklist for a New Photo Set

1. Look the photos over and cull obvious rejects.
 2. Select and rotate any images that need it.
 3. Set the locations.
 4. Enter the descriptions.
 5. Compare similar pictures, select the best, delete the others.
 6. Download, edit and replace individual photos as needed.
 7. When all are done, annotate the photo set with nickname and notes.
 8. Search for similar images in other photo sets, compare and cull.
-

5 Finding Photos

Anyone whose web browser can see PhotoTrove can look through the entire collection, no login required.

5.1 Browsing Photo Sets

Much of the time, we look for photos taken around the same time, in photo sets. If we've named the sets with timestamps and given them helpful nicknames, they're easy to find.

From the main menu, select **View photo sets** and scroll through the menu. When you select a set, you'll see the notes followed by the thumbnail gallery. Clicking on an individual thumbnail opens the webpic view.

If you're logged in, you'll see an **Edit Set** button to the right of the notes. Clicking that will open the familiar Photo Set Worksheet page.

5.2 Browsing Photo Albums

To show off our photos, we look through our photo albums. From the main menu, select **View albums** and scroll through the menu. When you select a photo album, you see the finished product.

Editing photo albums is covered below.

5.3 Searching

The real power of PhotoTrove is the search screen, **Search for photos** in the main menu. You can specify just about any criteria and find all photos that match.

Search for Photos

When taken:	between		and	
Where:	(anywhere)			
Text:				
	In:	☒ description	☐ caption in any album	☐ Match case
Tagged with:	☒ any of:	☐ all of:	☐ none of:	and tagged with:
	— Select one or more tags — greatest hits panorama panorama-to-do published recipe restaurant menu wrong time zone		☒ any of:	— Select one or more tags — greatest hits panorama panorama-to-do published recipe restaurant menu wrong time zone
Is video:	☐ yes	☐ no	☒ either	
Is in any album:	☐ yes	☐ no	☒ either	
File name:				(partial ok)
Description is:	☐ blank	☐ nonblank	☒ either	
Date/Time is:	☐ unset	☐ set	☒ either	
Limit results:	to	400	matches	☐ Display only first and last matches
Sort photos:	☒ by time	☐ by place and time		
Search				Reset

After you press **Search** you'll see a thumbnail gallery of matching photos. If you're logged in, you'll see a list of actions above the gallery, along with the familiar selection buttons.

6 Organizing Photos

6.1 Assembling a Photo Album

Having all your photos neatly annotated and accounted for is better than having a shoebox full of prints, but it doesn't offer much flexibility when you want to display them. For that, you'll want to organize your best photos into albums. Your audience can browse albums directly in PhotoTrove, or you can upload them to a static website, or you can burn them to a CD, DVD or thumbdrive, viewable on any computer.

All album operations (except just viewing one) assume you're logged in to PhotoTrove.

To create an album: You could just select **Edit albums** from the main menu, type an album name⁵ into the field at the top and click **Create**, but most often you'll just create an album on the fly as you add photos to it:

1. Open a thumbnail gallery, either a photoset worksheet page or search results;
2. Select one or more photos;
3. In the **Album:** action option above the gallery, enter the album's name⁵ in the field labeled **New Album name**. This is just convenient identifier for the album, not to be confused with its title.
4. Click **Append**.

Adding photos to an already-existing album works exactly the same way, except that you choose the album from the menu.

Editing an album:

From the main menu, open the **Edit albums** tool and select the desired album. The Album Worksheet page displays all the photos on Page 0.

Page 0 serves two purposes:

- It's a convenient holding area for photos appended to the album, so you can move them to other pages.
- It serves as the front, or title, page for the album, displaying no photos except an optional title picture.

You create album pages by moving photos to them.

Of particular interest is the **Edit Page Text and Format** button, which opens a separate tab where you can set the color scheme for the entire album and heading, text, and title picture for each page.

You can, at any time, see how the album will appear to others by clicking **View Album**.

6.2 Tagging Photos

There are innumerable ways to group photos, some temporary:

- Candidates for an upcoming contest;
- Timestamps to adjust;
- Panorama segments to stitch together;

Some long-term:

- Legal records;
- Recipes;

⁵ Album name: An album name must be a legal file name, an alphanumeric followed by alphanumerics, underscores or hyphens, with no embedded spaces or "weird" characters.

- Menus of favorite restaurants;
- Favorites.

PhotoTrove lets you make up any number of descriptive tags, attach them to any photos you wish, and then treat the tagged photos as a group:

- Some tools, like **Move photos between sets**, **Adjust timestamps** and **Apply dates** use tags to identify the photos in question.
- The **Assemble a panorama** tool looks for the predefined tag “panorama-to-do”.
- The **Search for photos** tool lets you combine tags and logical operators to make complex queries. It has two drop-down menus of tags, and in each one you can select “any of”, “all of”, or “none of” multiple tags (just hold down the Control key to select more than one from the menu). All the other search criteria are still available, as well.

Like albums, you create tags on the fly in the **Tag name** action option above any thumbnail gallery.

7 Sharing Photos

7.1 Sharing Individual Photos

It's easy to download an individual photo from PhotoTrove to your client machine, whence you can email it, upload it to a website, or post it to your favorite social media site. You need not be logged in to do it.

In any thumbnail gallery, click on the desired image to open the webpic view. You now have a choice:

- For many uses, the webpic-sized image you're seeing in front of you is perfectly adequate; since it's usually much smaller than the full-size image, it saves on space and network bandwidth. To download the webpic, just click right in the middle of the image and follow your browser's instructions.
- Sometimes only the full-size image will do. To fetch that, click the **Full Size** link and follow your browser's instructions.

For videos, there's a similar choice, not of size, but of the video/audio encoding scheme (or "codec").

- The webpic view is in the Ogg Theora format, one of the few currently playable directly in browsers that support HTML5. To download that, right-click in the middle of the video window, select something like "Save video as..." and follow your browser's instructions.
- You can also download the video in the original codec recorded by the camera. To fetch that, click the **Original-Format Video** link and follow your browser's instructions.

7.2 Publishing a Photo Album

Once you have an album built, you can view it at any time; the separate pages will be generated on demand. You can also use PhotoTrove to write all the data to its own folder as a set of static web pages, which you can then upload to a static website or burn to a CD, DVD or thumbdrive. And yes, everything will still work, including the video player.

Note

Since the album is just a set of relations in the database, it takes up negligible disk space. Even if you make a static album, all the images are links, rather than copies of the image files, so there's still no significant burden on your resources. On the other hand, when you copy the static album elsewhere, none of this applies, and it will take up more space.

To publish an album:

1. Log in² to PhotoTrove, open the **Publish albums** tool and select the desired album.
2. Click the link to view the album in a separate tab.
3. If space is short at the final destination, you can opt to omit the full-size images.
4. Click **Write**.
5. Click the link to view the written album and verify that it looks identical to the regular generated one.

The album files are written to `/home/web/webroot-ssl/trove/albums/` in a subfolder under your PhotoTrove user name. You can write more than one album, in which case PhotoTrove automatically updates the `index.html` file with links to each one.

In order to retrieve albums from the PhotoTrove server, you must have a user login account on the server.

What you do with the written album files depends on your goal as well as the configuration of your server and your client.

- You can log in to the server directly using your favorite ssh client, navigate to `/home/web/webroot-ssl/trove/albums/xxx/` where `xxx` is your PhotoTrove user name (not to be confused with your server login account name, although they may be the same) and:
-

- Transfer the files to a website;
 - Burn the album(s) to a CD or DVD;
 - Copy the album(s) to a flash drive.
- You can use your favorite file transfer client to download the album(s) from `/home/web/webroot-ssl/trove/albums/xxx/` and then use the client machine to make a CD, DVD, or flash copy or upload it all to a website.

Tip

When you've copied the album files where you want them, there's no particular reason to keep the written album files, since you can regenerate them whenever you wish. The **Publish albums** page has a convenient feature that deletes selected written albums and adjusts the `index.html` file accordingly.

If you'd like to display the album on the web but don't have access to a website, you have some options:

- Various organizations offer free web hosting. One I like is sdf.org aka freeshell.org aka paunix.org, which offers much more and is worth a look in any case.
 - Paid web hosting is getting less and less expensive, but is still a bit much just to display photos occasionally.
 - If you know what you're doing, you can run your own webserver and make it visible to the Internet by tweaking your firewall settings for port-forwarding. Be careful; if possible, set up a "DMZ" with no access to your internal network.
 - Thanks to a recently-released program called [ngrok](http://ngrok.com), you can run a webserver on your own local network, behind your firewall, and still make it visible to the internet, without the tricky and risky business of tweaking your firewall for port-forwarding. Since web service doesn't call for much processor horsepower, you can use any spare machine for this, or a virtual machine, or something like the credit-card-sized [Raspberry Pi](http://raspberrypi.org). Like the PhotoTrove server, the web server won't need a monitor, keyboard or mouse, at least not after you've finished setting it up.
-

8 Safeguarding the Collection

Be sure to have some reliable method of backup and recovery for your photo collection that doesn't depend on conscientious, repeated actions by human beings; it should be as fully automated as possible.

And don't forget to include database dumps (the data exported to a structured text file) in the backups.

8.1 Dumping the Database

When you're logged in, it's a good idea to click the **Export database** tool in the main menu every so often, and certainly before you log out at the end of a session. This saves the entire database as a specially-formatted text file from which the database management system can rebuild everything. Database dumps will accumulate under `/home/public/dumps/` but don't worry; older ones get purged so there will never be more than 8 dump files.

8.2 Backup Strategies

You need a place to save the photos and database dumps.

- The simplest solution is to attach an external disk drive. A nightly `cron` script should dump the database, mount the drive, mirror all the relevant files on it and then unmount the drive.
- If you have another computer with adequate disk space, you could use it as your backup server (or you could dedicate a machine for this purpose). Again, a nightly `cron` script should dump the database and then mirror the files over the network using `rsync` or something similar. You'll need some ssh key-management system, like `keychain`, to allow unattended yet secure transfers.
- As long as you're doing your backups over a network, you may as well use a computer that's geographically separated, like a friend's house. `rsync` uses `ssh` to transfer the files over an encrypted tunnel. Of course, file transfers over the Internet are a lot slower than over a local network, so you should probably have a local backup for speed and then replicate that one to the remote site.

Whatever method you use:

- Ensure that it happens automatically (but allow *ad hoc* backups by users at any time).
 - Verify that the automatic backup actually took place, perhaps by having it leave a log in a user's home directory.
 - Test the backups from time to time to ensure you can restore from them; otherwise, what's the point?
-

9 Assembling Panoramic Photos

A panorama is an assembly of multiple overlapping images to create a single image with an extra-large field of view. Typically, you create a panorama with these steps:

9.1 Taking Panoramic Photos

The general idea is to take a series of shots, either left-to-right or right-to-left, with some overlap (say a third) between each photo and the next. Keeping the whole series level is tricky, and a tripod can help here.

Many cameras offer features to help align successive images with consistent focus and exposure. Moreover, they identify photos that are panorama components with distinctive filenames or even separate folders.

But if your camera lacks those features, don't despair; a little practice will do the job well enough that the increasingly-smarter panorama stitching software can take care of the rest.

Whenever you import a photo set containing panorama segments, be sure to tag them with “panorama-to-do”.

9.2 Stitching the Panorama

1. Log in² to PhotoTrove and open the **Assemble a panorama** tool.
2. It will offer a menu of all photo sets containing panorama segments. Select one.
3. You'll see a thumbnail gallery for the photo set, with panorama components highlighted. Select the ones you wish to assemble, typically using **Select Range**. When the complete series is selected, click **Continue**.
4. Verify that these are the photos you want and click **Download**. The images will be downloaded to your client wrapped up in a single `tar`⁶ file.
5. On your client computer, unpack the `tar` file (most archiving utilities can handle it as easily as, say, a ZIP file). Voilà! Here are the files. At this point you can delete the `tar` file if you wish.
6. Use your favorite panorama-stitching tool to assemble the components into a final large image. I strongly recommend Hugin (<http://hugin.sourceforge.net/>). The days of stitching panoramas by hand are fortunately behind us, except for some unusual cases.
7. You might wish to edit the panorama further, in which case use your favorite photo editor.
8. When done, return to PhotoTrove's panorama page (you may have timed out and need to reload the tab where you logged in) and upload the finished panorama. After a while you'll see the thumbnail gallery again, with a button at the top that will display the finished panorama for your review.

⁶ **tar** file: **tar** is an archiving utility as old as Unix itself, convenient for packaging multiple files. Since JPEG files (most photos) are already compressed, there's no need or point in applying more compression.

10 Tips and Tricks

Some handy ways to use PhotoTrove more efficiently and enjoyably:

- PhotoTrove uses certain terms in very specific ways. To avoid confusion, refer to the [Glossary Glossary](#). For a pictorial representation, have a look at the [Data Model](#) Section [A.3](#).
- Take advantage of your browser's tab capability. Once you've logged in, open menu items in a separate tab. Not only does this leave the main menu available at any time, it allows you to recover from session time-outs by reloading the first tab, thereby repeating the login.
- If you need to refresh a thumbnail gallery to see changes you made in other tabs, **don't reload the page!** Your last action on that page may have been, say, "rotate images" and reloading the page will repeat that action while you gnash your teeth in annoyance.

The best way to refresh any thumbnail gallery is to click **Clear Selections**. For similar reasons, don't use the browser's Back button.

- The single exception to that rule applies when you need to perform more than one action on a range of images. For example, you have four panorama segments, and you want to tag them *and* assign a location *and* assign a description:
 1. Select the range;
 2. Apply the tag "panorama-to-do";
 3. Hit the browser's Back button to re-select the range;
 4. Assign a location;
 5. Hit the browser's Back button to re-select the range;
 6. Assign a description.
- When searching by date/time:
 - Note that PhotoTrove is pretty smart about interpreting dates. You can enter things like "yesterday" or "last Wednesday". If you specify a date without a year, it will assume the current year.
 - Specifying a date but no time means the midnight that begins that day, in the local time zone of the server.
 - Specifying a start date but no end date means "on or after the start date". Similarly, specifying an end date but no start date means "before the end date".
- When searching, it's tempting to erase the criteria for a previous search and enter new ones, yet sometimes the results come out wrong because you overlooked some field. Solution: when starting another search after completing one, use the **reset** button to clear everything.
- Clicking **Search** with no criteria set will find all photos in your collection. Since you probably have more than the default limit of 400, it will display only the first and last, but it's a quick way to get a count of all your photos. It'll also tell you how many are missing timestamps and locations.

11 Other Photo Set Operations

11.1 Adding Individual Photos

The **Add single photos/videos** does just that. First select the target photo set, then browse for the photo or video you want to add. Click **Upload File**, enter the appropriate metadata and add the new image.

11.2 Moving Photos Between Photo Sets

A photo set is the most basic grouping for photos and videos. Analogous to rolls of film, photo sets contain sequences of images taken during a single time period or at a single location. Photo sets can be fragmented: vigorous culling of similar photos can leave a photo set all but empty; a trip may start in the middle of one set and go on to span several later ones; some cameras start a fresh folder after a set number of shots or for every panoramic sequence. In such cases, some housekeeping can help organize photo sets more logically and efficiently.

1. Use the “Tag selected photos” feature in any thumbnail gallery to assign a particular tag to those photos, and only those, that you want to move to a particular target photo set;
2. Select **Move photos between sets** from the main menu;
3. Select the appropriate tag;
4. Specify the desired photo set;
5. Click the **Move tagged photos...** button to move the photos;
6. When the photos are where you want them, click **Untag All**.

11.3 Deleting an Empty Photo Set

When a photo set contains no more photos, perhaps because you’ve deleted the last one or moved it elsewhere, you’ll see a button offering to delete it.

Of course, this won’t affect the original folder under `originalphotos`, but don’t worry, PhotoTrove remembers the folder names of deleted photo sets so they don’t reappear in the menu of folders to import!

11.4 Adjusting Timestamps

Photo Trove saves photo timestamps in Coordinated Universal Time (UTC) and displays them in the current local time⁷. Sometimes photo timestamps are incorrect by a fixed amount, perhaps because the camera’s clock was set to a different time zone or because the clock was simply wrong. The **Adjust timestamps** tool adjusts the timestamps for any number of photos in a single action.

1. Use the “Tag selected photos” feature in any thumbnail gallery to assign a particular tag to those photos, and only those, whose timestamps you wish to adjust by the same amount;
2. Select **Adjust timestamps** from the main menu;
3. Select the appropriate tag;
4. Enter the desired time adjustment and direction and click Set;
5. When the timestamps are correct, click **Untag All**.

⁷ Local time: this means the time zone of the PhotoTrove server (just in case you’re using PhotoTrove from far away!)

11.5 Applying Dates

Sometimes photos have no timestamps, for example, digital scans of slides, negatives or prints. In such cases, the approximate date may be known, though not the precise time. The **Apply dates** tool applies a date (with time 00:00:00 local) to selected photos.

1. Identify all photos for which you want to set the dates.

Tip

The **Search for photos** tool can find photos whose date/time is unset.

2. Use the “Tag selected photos” feature to assign a particular tag to those photos.
3. Select **Apply dates** from the main menu;
4. Select the appropriate tag to display a thumbnail gallery;
5. For each date you wish to set:
 - a. Use the **Select Range** feature to select the individual photos to which it applies;
 - b. Use the calendar to specify a date, or enter the date as text;
 - c. Click **Apply**.

PhotoTrove will apply the date to all the selected photos and remove the tag, so they disappear from the thumbnail gallery.
6. Repeat for every date you wish to apply.

Tip

For convenience, the date in the calendar box remains set between operations, since the next date is likely to be closer to that one than to today's date.

12 Housekeeping

As the collection grows, you'll accumulate lots of metadata, including locations, tags and albums. Sometimes you'll need to make changes. Sometimes you'll find that your menus are cluttered with items you aren't using much lately.

PhotoTrove has features to help manage menus and keep up with changes.

12.1 Managing Locations

The **Manage locations** tool lets you:

- Change a location's name;

Tip

This is particularly handy for the location "Home" since most of us reside in more than one place during our lives. Use just plain "Home" for your current address, and add a bit more detail, like the town, for previous addresses. When you move, edit the current "Home" to add a town and create a new Home for your new address. The full address and any other information of interest goes into the Notes field.

- Add notes about a location, like full address or why it's significant;
- Designate a location as "archived" (or not). All this means is that archived locations don't appear in menus.

12.2 Managing Tags

The **Manage tags** tool lets you:

- Change a tag's name;
- Add notes about a tag, explaining what it represents;
- Designate a tag as "archived" (or not). All this means is that archived tags don't appear in menus.

12.3 Managing Albums

In addition to the regular [album-editing operations](#) [Editing an album](#), the **Edit albums** tool offers some occasionally-used housekeeping features. You can:

- Change an album's name⁵;
 - Designate an album as "archived" (or not). All this means is that archived albums don't appear in menus, handy for albums commemorating events from long ago;
 - Delete an album, though you'll almost never want to do this, since an album takes up very little in the way of resources but typically represents a fair amount of effort. More likely, archiving is a better solution.
 - Add notes about an album for your personal reference, invisible to all but you. This feature is at the head of the **Edit Page Text and Format** page.
-

13 Playing with Matches

If you're comfortable running shell scripts, you'll find some useful tools in the `scripts/` subdirectory. They handle tasks that most of us will rarely need; indeed, if you find you need any of them more than rarely, let me know and I'll make a web-based version as a regular tool under PhotoTrove. I'll describe them here.



Caution

Be sure you know what you're doing. Running these scripts requires logging into a shell account on the PhotoTrove server. Consider reading over any script you're planning to use so you understand how it works.



Warning

Don't experiment with scripts other than those described here! Most of those scripts are development scaffolding, installation components, or temporary solutions to tricky issues. Many of them were written for older versions of PhotoTrove and its predecessor, and will yield unpredictable, possibly destructive, results. You have been warned.

13.1 Taking PhotoTrove on the Road

If you carry a laptop with you when you travel, you could install PhotoTrove on it—either directly or inside a virtual machine like [Trovester](#) Appendix C—and then while away your evenings uploading photos and editing photo sets. But how do you get all that into your regular PhotoTrove server when you return home?

The answer is to configure your laptop PhotoTrove as a “travel version”, set up exactly like the regular server except that the root is

```
/home/web/webroot-ssl/trove/tvl/
```

instead of

```
/home/web/webroot-ssl/trove/
```

Once you have that in place:

1. On your travel server, log in as a user with sufficient sudo privilege to become the webserver user “www-data”, in order to write to the fullsize and webpics subfolders.
2. Fetch, from the regular PhotoTrove server, a dump (gzipped is ok) of the latest version of the production `trove` database.
3. Run the script:


```
sh resettvl.sh dumpfile
```

 where *dumpfile* is the path to the `trove` database dump.

This will erase any photos from the travel environment and reinitialize the `trove_tvl` database, preserving the production environment's locations, tags and user accounts (with passwords and privileges).
4. You're ready to use the travel version; just browse to `.../trove/tvl/` and log in as usual.

When you return from your travels:

1. Run the script with the help option:


```
sh integrate.sh -h
```

 to display the detailed, step-by-step instructions. Note that you'll need to move the image files manually.
 2. Transfer the tar'ed images and the `trove_tvl` dumpfile to the PhotoTrove server and untar the images into the file tree, all as described in the instructions.
 3. On the PhotoTrove server, run the script:


```
sh integrate.sh trove dumpfile
```

 where *dumpfile* is the path to the `trove_tvl` database dump.
 4. Copy any uploaded camera folders in `home/public/photos/` to the PhotoTrove server for archival purposes.
 5. Delete the leftover tarfiles on both hosts.
-

13.2 Cloning a Photo Album

Occasionally you might wish to make several similar albums, perhaps with a slightly different mix of photos, or a different text or page arrangement, but otherwise the same. The simplest way to accomplish this is to build an album as a “baseline” or “template”, make copies of it, and then modify the copies as needed.

Since an album is entirely a database construct, a script can do this.

Run the script:

```
sh clonealbum.sh database albumname newalbumname
```

where:

database is the name of the database, normally `trove`

albumname is the name of the original album to be cloned

newalbumname is the name for the new album to be created.

13.3 Copying a Page from One Album to Another

Sometimes you don’t need to clone a whole album but you might want to copy or move a page or two from one album to another.

Run the script:

```
sh cypagebetweenalbums.sh database album1 page album2
```

where:

database is the name of the database, normally `trove`

album1 is the name of the album that has the page

page is the number of the page to be copied

album2 is the name of the album to receive the copied page.

PhotoTrove appends the desired page as the last page of *album2*. Use **Edit albums** to move the page where you want it.

14 Glossary

The instructional sections of this manual use certain terms in very specific ways. To avoid confusion, this section explains their meanings and how they are related.

album

An ordered set of **album pages**, with a **title page**.

album page

An ordered set of any number of **album photos** with its own title, **title picture** and text, associated with a particular album.

album photo

An association of a **photo** with an **album page**, with a distinct caption and display order. More than one album photo may refer to a single photo, even on the same album page.

title picture

An optional designation for each **album page**, identifying one of the **album photos** on the page to be displayed at the top of the page in an intermediate size.

title page

A special “page zero” **album page** with a table of contents linking to the other **album pages**.

original

A digital image or video, as recorded by the camera or other external source, uploaded to the **originalphotos** area, copied to the PhotoTrove image repository (as the **full-size** master image) and thereafter maintained in the archive for backup purposes.

photo

An aggregate entity comprising a **full-size image**, a **web-sized image**, a **thumbnail image** and associated metadata. Identified by a foldername (corresponding to the containing **photo set**) and a filename.

full-size image

A full-sized digital image, initially copied directly from the uploaded **original** and thereafter maintained as the master image for editing.

web-sized image, webpic

A reduced-size image suitable for viewing in a web browser or transmitting over a network. The exact dimensions of web-sized images are configurable (default and per-**photo set**).

thumbnail image, thumbnail

A much-reduced image suitable for quick browsing and selection; generally multiple thumbnails will appear on a single screen as a “thumbnail gallery”.

photo metadata

The PhotoTrove database retains information about the photo, including timestamp, location, description and geometry, some extracted from the image’s EXIF data, some derived automatically and some entered by the user.

photo set

A set of **photos** and/or **videos** taken sequentially, in one or more sessions, but not necessarily otherwise related. Conceptually equivalent to a roll of film or the contents of the camera’s flash memory. Identified by a foldername.

video

An aggregate entity comprising an **original-format video**, an **oggfile**, an associated **still image** and metadata.

original-format video

A single file that comprises many images and, usually, a sound track, in the format recorded by the camera. Videos are handled the same as **photos** to the extent that makes sense.

oggfile

A version of the video converted to the Ogg Theora format for convenient playback in HTML5-capable web browsers.

still image

A **photo** that represents a video in the various “gallery” views of **photo sets** and **albums**. If the camera hasn’t automatically generated one, PhotoTrove will automatically extract a still from the **oggfile** for a newly-imported video.

video metadata

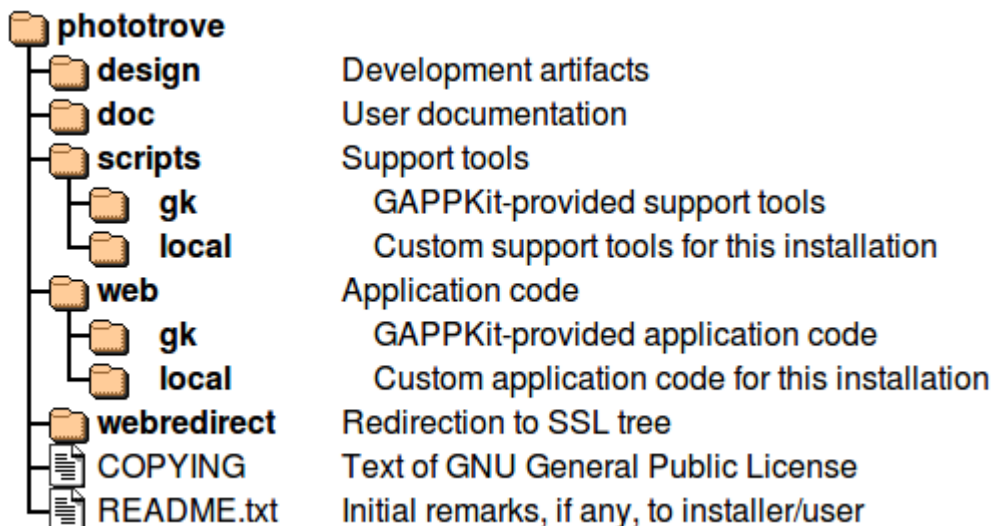
Since the still image is a photo, most of the metadata is contained therein, but the database also tracks the video's geometry.

A Architecture and Design

PhotoTrove is built upon the **GAPKit**, a framework for constructing web applications using **GNU/Linux**, the **Apache** web server, the **PostgreSQL** relational database management system and the **PHP** language.

A.1 Distribution

PhotoTrove comes as a gzipped tarfile; when unpacked, it contains a tree of the following folders:



A.2 Application Code

The PHP code (under `web/` in the distribution) resides under Apache's SSL service (`https://`) document root. My recommended location for PhotoTrove's code (and where **EasyPhotoTrove** puts it) is `/home/web/webroot-ssl/trove/`. The "regular" service (`http://`) tree contains, at `/home/web/webroot/trove/index.php`, a redirector page that switches to the SSL tree.

Four data subfolders are added within PhotoTrove's code folder `/home/web/webroot-ssl/trove/` at installation:

fullsize/ and **webpics/** contain the full- and reduced-size images, respectively.

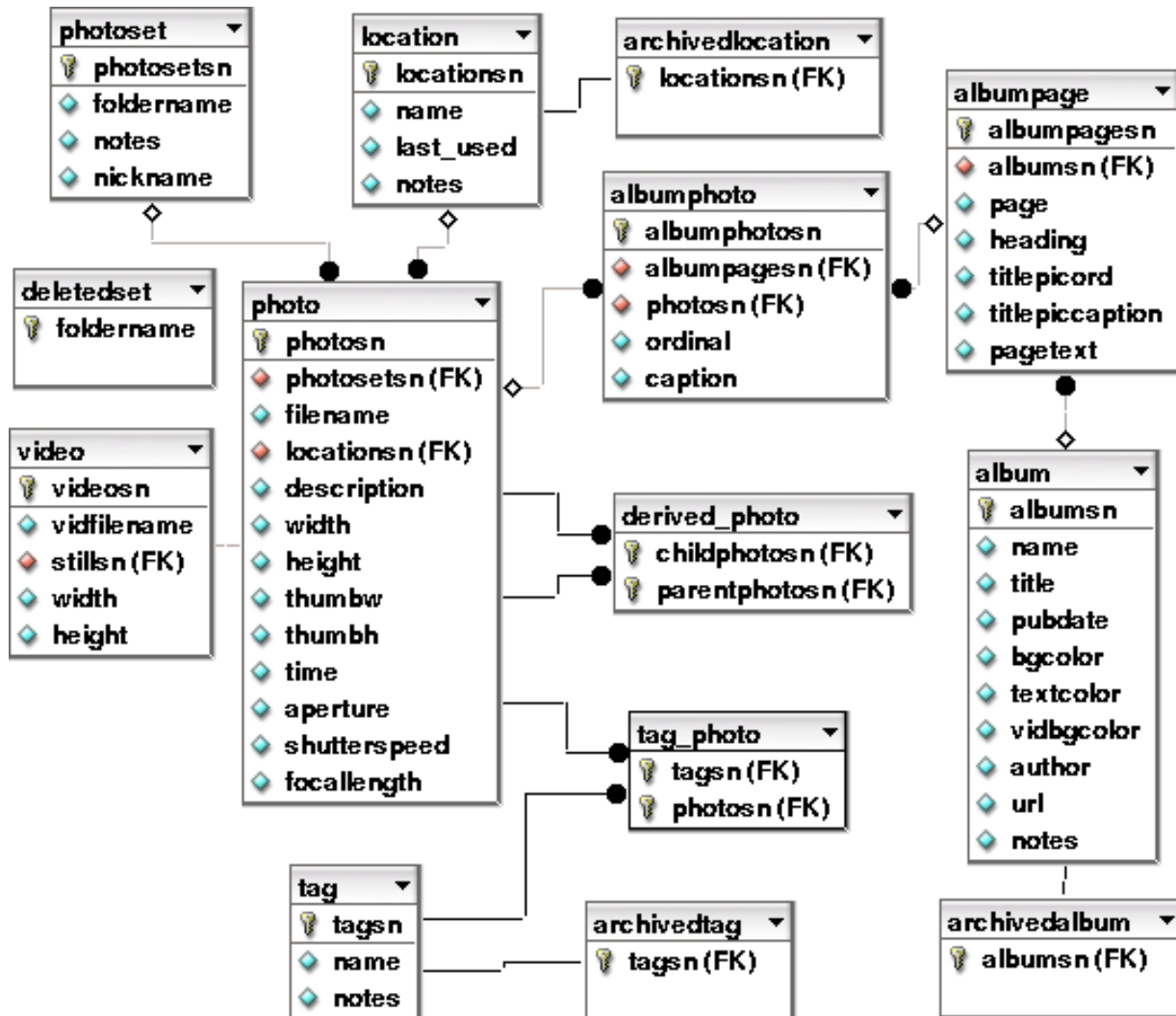
originalphotos/ is where PhotoTrove looks for new photos to import; typically this is a symbolic link to somewhere more convenient like `/home/public/photos/` or, in the case of the Trovester virtual appliance, a shared folder. PhotoTrove reads `originalphotos/` (to copy photos to `fullsize/` when importing) but doesn't write to it; it serves as an archive for unedited originals.

albums/ is where PhotoTrove places published albums (trees of static webpages) so they can be burned to a CD or uploaded to a website. Each user gets an individual subfolder for published albums. In the Trovester virtual appliance this is a symbolic link to a shared folder. In a regular installation, it may or may not be a link depending on convenience (users need only read access).

A.3 Data Model

I maintain the data model using **DB Designer Fork** (currently version 1.4⁸), which automatically generates the schema-building SQL scripts and ERA diagrams:

⁸ The DB Designer Fork project seems to have slowed to a crawl; the latest release (1.5, April 2010) offers only a Windows binary but no source or GNU/Linux binary. The version I use is 1.4, released July 2007. Even then, I have to fiddle with it to get it to work, but there's nothing better available. Once it's working, it's pretty good.



The central entity in the PhotoTrove model is, not surprisingly, the **photo**. Every photo is contained in a **photoset**, a sequential series analogous to a roll of film. A **video** is a separate entity associated with a single photo that serves as its still image, or thumbnail.

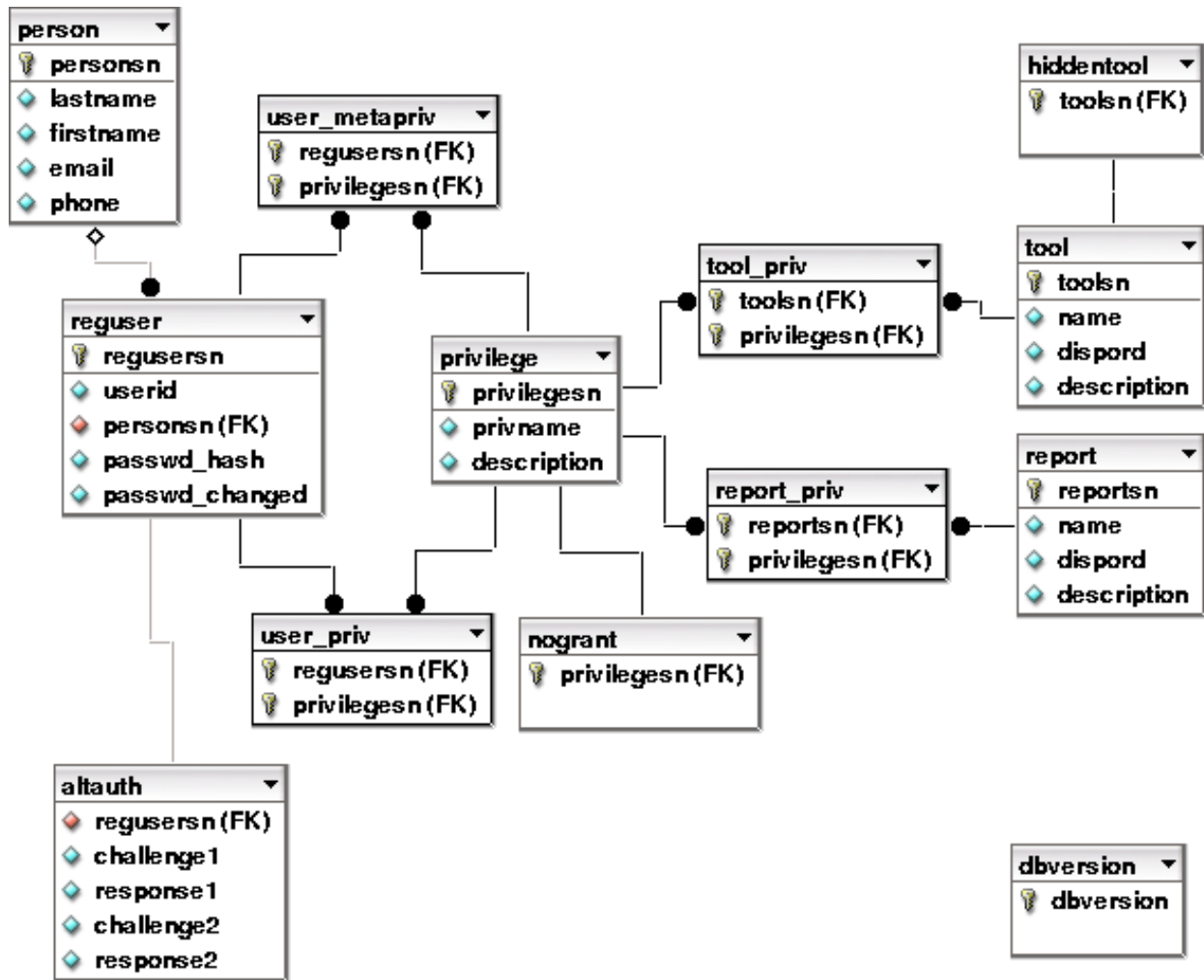
The **location** entity allows for a user-defined list of locations where photos are taken. Users may also define **tags** and apply them to photos to support complex groupings.

The primary product of PhotoTrove is photo albums that present collections of photos for display and distribution:

An **album** comprises one or more **albumpages**, each of which can contain any number of **albumphotos**. Each albumphoto is an instance of a photo in a particular position on a particular albumpage.

Albums, locations and tags may be *archived*; this means simply that they don't appear in menus, but can be restored to regular status when needed again.

A separate ERA diagram depicts the common underlying architecture of **GAPPKit** applications, documented elsewhere:



B Configurations

There are three ways to run your own PhotoTrove:

1. The very easiest is to download the [Trovester](#) Appendix C “appliance”, a self-contained virtual machine that will run on most recent computers. All you need to give it is disk space for your photos and albums.
2. The next easiest is to build your own PhotoTrove machine using [EasyPhotoTrove](#), a set of scripts and configuration files that automates the installation. It makes good sense to dedicate a computer as a photo server so the members of your household can all use it. I build each release of [Trovester](#) Appendix C by creating a virtual machine running Debian GNU/Linux, installing EasyPhotoTrove and then exporting the virtual machine as an appliance.

Tip

Another advantage of EasyPhotoTrove, which also applies to Trovester since it's built with EasyPhotoTrove, is that you can [upgrade automatically](#) to the latest version of PhotoTrove.

3. Finally, you can install PhotoTrove on an existing machine that you also use for other purposes. Depending what's on your machine and how you've configured it, you might be able to use EasyPhotoTrove to automate the installation. If you'd rather do the whole thing yourself and have the requisite system administration skills:
 - a. Start by downloading the entire EasyPhotoTrove and PhotoTrove packages:

```
wget http://www.tux.org/~tbr/easyphototrove/easyphototrove-latest.tgz
wget http://www.tux.org/~tbr/phototrove/phototrove-latest.tgz
```
 - b. Look over the scripts, beginning with `install.sh` and continuing with the ones in the respective `scripts/` directories.
 - c. Adjust as needed for your situation.
 - d. Email me if you need assistance, within reason.

C Trovester, the PhotoTrove “Toaster” — a Virtual Appliance

An easy way to try PhotoTrove is as an “appliance”, a self-contained virtual machine complete with its own operating system, supporting packages and the PhotoTrove software. All interaction is via your web browser and shared folders⁹. Of course, since the Trovester virtual machine has its own network presence, other users on your local network can use it at the same time.

If you decide you like PhotoTrove, you can either install it directly or simply continue using Trovester as your permanent photo server.

C.1 System Requirements

If your computer is of relatively recent vintage, you can probably run Trovester, but check this list just to be sure:

- A computer running any platform that can run VirtualBox¹⁰ (GNU/Linux, Solaris, Mac OSX, Windows).
- At least 1 GB memory; Trovester uses 0.5 GB¹¹ and you still need to run your host.
- Disk space adequate to hold your entire photo collection twice (since PhotoTrove lets you keep a separate archive of original photos unaffected by subsequent editing). All data, namely the photos and database dumps, are in a shared folder on the physical host (which can even be on an external hard disk). In addition, reserve ca. 4GB separately for the appliance (it probably uses about half that but could grow depending what you do with it). A few tens of gigabytes should do it until your collection grows huge.
- A web browser running on your physical host, since PhotoTrove is a web application and Trovester is a server.
- Whatever photo-editing software you prefer; I recommend GIMP for images and Avidemux for videos.



Warning

Make sure the host machine and the disk(s) where you plan to store your data are reliable. In particular, check the settings for suspending/hibernating/sleeping to make sure the host doesn't go to sleep while Trovester is processing photos.

C.2 Installation and Configuration

This boils down to installing VirtualBox, importing Trovester as an appliance, setting its network address, and defining the shared folder:

1. Install VirtualBox from [virtualbox.org](https://www.virtualbox.org). The appliance was developed under the Free edition and uses none of the non-Free features. For some platforms, it may be difficult to obtain installable binaries of the Free edition, but the proprietary edition will work, too.
2. Download the [Trovester OVA file](#).
3. Using the VirtualBox Manager GUI, import Trovester (*File/Import Appliance*). Trovester will appear in the virtual machine list.
4. Select Trovester and then open the *Network* settings; verify that it's using a bridged adapter.
5. Edit Trovester's *Shared folders* settings to create a shared folder. This can be anywhere on the physical host, including an external or removable drive.

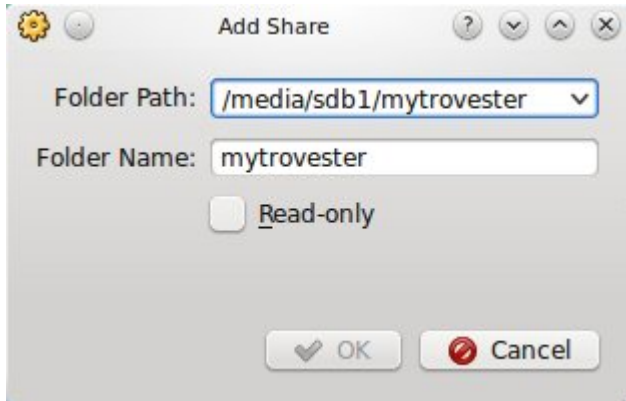
⁹ A shared folder is accessible to both the host system and the virtual machine without the need for networking.

¹⁰ VirtualBox: The appliance is distributed in the Open Virtualization Format, which I understand can run under other virtualization packages like VMware, but I haven't tried that and don't know if all the features will work.

¹¹ Memory: Of course, if you have enough memory, you can allocate more to Trovester and it will run faster.

**Important**

Be sure to name it `mytrovester`, since that's the name Trovester will look for.



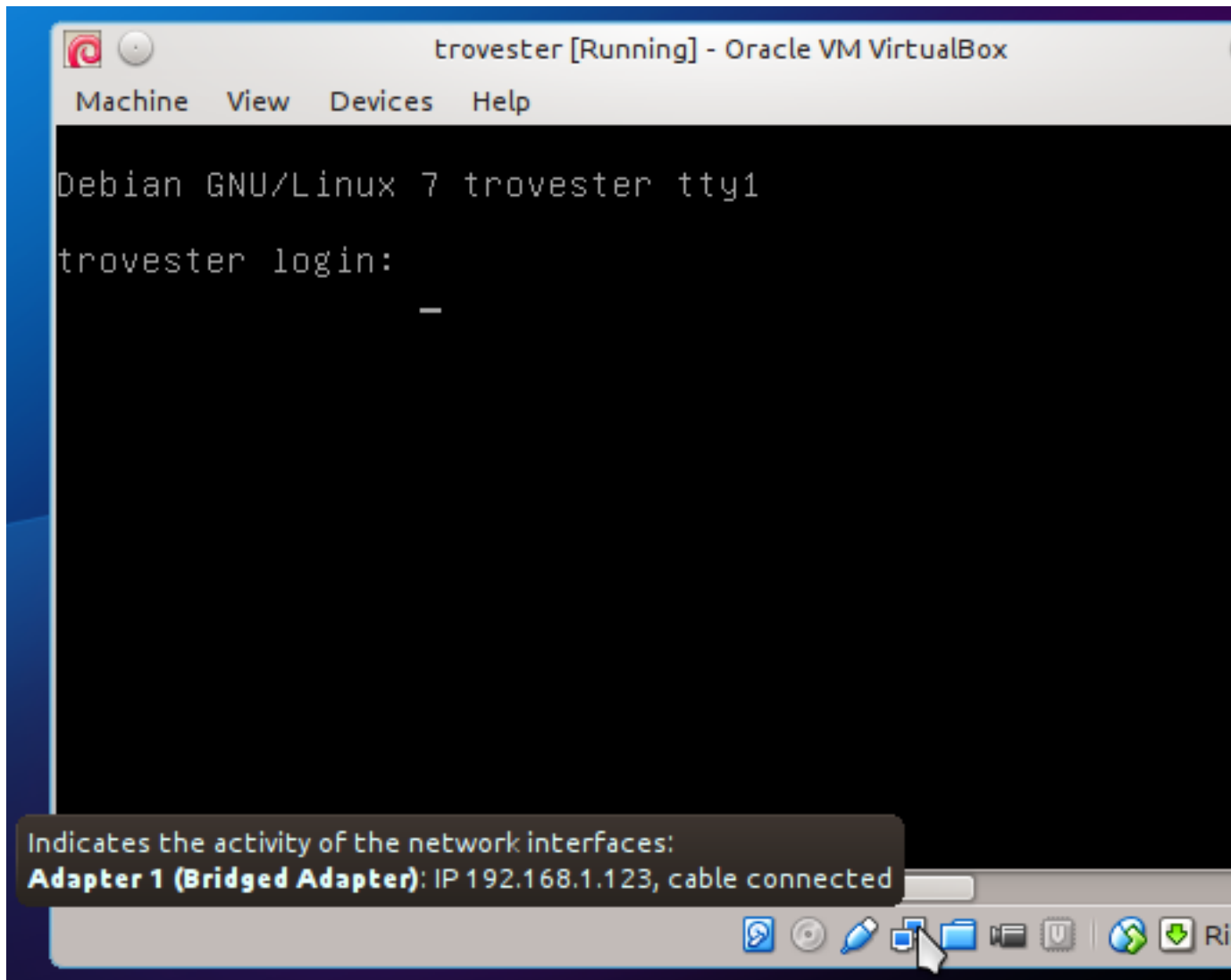
C.3 Operation

1. If your shared folder is on a removable device, make sure it's attached and mounted.

**Warning**

This bears repeating: **Make sure the shared folder is attached and mounted!**

2. Start Trovester. A console window will open and you'll see the boot sequence while each process starts up and reports its status. At some point it will complain about failing to mount the external drive; don't worry about that, it will mount it later in the sequence. It will finish with a **login:** prompt. If you move your mouse over the network icon at the bottom of the window, it will display the IP address:



Note

As built, Trovester gets its network address from the local DHCP server. Unless you've explicitly set up a separate DHCP server, it's probably your router or wireless access point.

Typical home routers give out addresses with long lease times so Trovester's IP address is unlikely to change often, unless you have lots of machines coming and going on your network.

If you want to ensure that Trovester's IP address never changes, you'll need to log in to your router via your browser to reserve an IP address for Trovester's MAC address (which you can see in the VirtualBox network settings). Once you've done that, you can modify your client machine's `hosts` file^a so you can access Trovester by name.

^a **hosts** file: for GNU/Unix, `/etc/hosts`. For Windows, `C:\Windows\System32\drivers\etc\hosts`.

- Since all regular PhotoTrove actions are accomplished through the web browser, there's no need to log in at the Trovester console window. Minimize this window to get it out of your way, but don't close it, or you'll shut Trovester down!
If you ever wish to log in, say, to update the PhotoTrove code or run scripts, the user id is `xyZZy` with password `xyZZy!42`. Feel free to change the password using the `passwd` command. Note that you need not use the console, since you can log in remotely with your favorite secure shell client. To log out, type `logout` or `exit`.
- In your web browser, open `https://address/trove/` where *address* is the Trovester IP address.

Tip

You'll need to allow Javascript and accept cookies from PhotoTrove and, if prompted, accept the self-signed security certificate.

5. At the main screen, log in as `xyzzzy` with password `xyZZy!42` and you're in. Feel free to change the password.
 6. If you wish to add different user accounts, log in as `useradmin`, password `xyZZy!42` and do so (**Manage User Accounts**). Users will need the `edit` and `walbum` privileges in order to make changes to the database (**Grant Privileges to Users**).
 7. To import photos into Trovester, copy them into uniquely-named folders³ inside the `mytrovester/public/originalphotos/` folder. A good way to ensure unique names is to use date and time, for example `20150105-232013`. When you select **Import a photo set** from the main menu, the folders will be there to select.
 8. Use the various tools to import and edit photosets and assemble photos into albums. When you complete an album to your satisfaction, use **Publish albums** to write it out as a set of static webpages. You'll find the album in the shared folder under `public/albums/userid/` (where `userid` is your PhotoTrove user name). You can burn this to a CD or DVD or upload it to a website; it will be viewable in a browser without needing PhotoTrove.
 9. When you've done what you wish with the published album, you might consider deleting the written copy to save disk space; the **Publish albums** tool has an option for this purpose. You can, of course, generate a fresh copy at any time.
 10. When you finish your session with PhotoTrove, and any time you've made significant changes, it's a good idea to export a copy of the database using the **Export database** tool in the main menu. Database dumps will accumulate in the shared folder under `public/dumps/` but don't worry; older ones get purged so there will never be more than 8 dump files.
 11. To shut down Trovester, restore the console window you minimized earlier. From the *Machine* menu, select *ACPI Shut-down*. This will initiate an orderly shutdown of all running services and finally the virtual machine itself.
 12. When Trovester is fully shut down (VirtualBox's list will indicate "Powered Off"), you can safely remove the device with the shared folder (if it happens to be a removable device).
-